capital in which the session is held, have to undertake a journey of 500 or 600 miles, or even 1,200 miles, as in the case of those who attend from New Zealand, or who, living in Brisbane, attend a meeting in Adelaide, or *vice versa*.

These very long distances are a great disadvantage to the Association, for they mean a considerable expenditure of time and money, and many are thereby debarred from attending. It is largely due to these causes, as well as to the limited number of working members, that we have had most reluctantly to substitute biennial for annual sessions. If we had more working members, and I think we should get them if there were local scientific societies scattered through the Colonies, we should be able to resume our annual meetings, and before very long we ought to be able to hold our sessions in towns like Ballaarat, Bathurst, Bendigo, Goulburn and Newcastle.

For the formation of local societies it is not necessary to start with a large membership—the Royal Society of London began with five or six only.

It is, however, very gratifying, under the circumstances, and with our comparatively limited population, that our meetings are as well attended and successful as they are.

A. Liversidge.

THE RED COLOR OF THE SALT LAKES IN THE WADI NATROUN.

In an article published in the *Zoolog. Anzeiger** I have given a report on the biology of the Natron Valley, the Wadi Natroun, in the Libyan desert, about 170 kilometers from Cairo. It seems that my remarks concerning the red color of the water of the salt lakes of the valley have interested readers of the article. I, therefore, wish to add here some researches I was able to make on the same subject owing to the kindness of Mr. Prochaska, head of the chemical survey of the soda company.

When I came to the Natron Valley the red water of the lakes excited at once my curiosity, and I tried to ascertain the reason for the redness of the liquid. Most people to whom I spoke about the matter told me that *Artemia* lives in the lakes, and that the red color of this Crustacean is communicated to the water. During my stay in the Wadi the *Artemia salina* was not to be seen, the animal appearing only at certain periods of the year. It is impossible to believe that the colored mass of these small creatures is sufficient to stain such immense quantities of water as the Wadi Natroun lakes. These lakes, about fourteen in number, lie rather close to each other and extend over a space of about 40 kilometers. No number of *Artemia salina* would be great enough to give the water the deep purple color which it has. If there were frogs in the lakes and those frogs were red, and some one should say that the red color of the water came from the red color of the Amphibia, this explanation, I think, would not be much inferior to the *Artemia* theory. Besides *Artemia* there are other red animals in the lakes. I obtained, for example, a red culicid larva. This shows that animals living in the water may take the color from it, and not the water from the red animals. Finally, *Artemia salina* disappears in the lakes for the greater part of the year without causing a change in the coloration of the water.

But, if it is not *Artemia salina*, what is it that gives the red color to the water? In my investigations I treated the red water with different chemicals, among them acetic acid. When the acid is poured into the red water a powerful development of carbonic acid takes place, and at the same time a red soft mass rises to the surface of the liquid, while the latter loses more and more of its color. From a large quantity of

* Das Wadi Natroun in der libyschen Wüste und seine niedern Thiere. Bd. 22, p. 53–61, 1899.

water I collected the soft red mass swimming on the surface, washed it with distilled water and shook it in a mixture of ether and absolute alcohol. The red color left the soft mass being extracted by the ether. The solution of the color in ether did not keep the purple tint of the soft mass, but showed a fine brownish coloration, the soft mass itself appearing now as a gray yellowish substance, reminding one of blood fibrine. It could be reduced to ashes and is, therefore, of organic composition. When the lake water was directly exposed to the mixture of ether and alcohol without having passed through acetic acid no result was obtained. Concerning the osmotic property of the red organic mass it is to be noted that it did not pass through a membrane of so-called parchment paper, such as is used for covering jars.

The experiments show that the water of the lakes contains an astonishingly great quantity of organic red substance and that it is this which gives the red color to the water.

The question now arises what the origin of the red organic substance is. My supposition is that the substance must be the product of bacteria. Each drop of water taken from the lakes will be found full of them. The bacteria in all the lakes are uncolored, but I found that the cocci exhibit a red color.

According to 'Baedeker' (Egypt, French edition, 1898) there existed another spot in Egypt, near Suez, where red salt water is found. On page 162 of the guide book I read the following note: "La coleur rouge des marais salants entre des collines des Bédouins et le canal, provient d'une petite écrevisse (de l'ordre des phyllopodes) presque microscopique qui y fourmille à certains moments. Le matin ils exhalent un parfum semblable à celui des violettes." Unfortunately, when I was at Suez I did not visit the 'marais salants,' and I, therefore, wish to call this note to the attention of the biologists visiting that part of Egypt. It would be very interesting to ascertain whether the water there contains bacteria and the same red organic mass which I found in the lakes of the Natroun Valley.

J. DEWITZ.

SCIENTIFIC BOOKS.

Man: Past and Present. By A. H. KEANE. Cambridge Geographical Series. Cambridge, University Press. 1899. 12mo. Pp. 184. Plates 12.

This volume is the sequel to Mr. Keane's 'Ethnology,' which appeared as the first of the series in 1896, and the two must be read together. The author has devoted his life to ethnology, and he has lived for many years in London, surrounded by the best resources of libraries, museums and men. Every authority worth consulting has been within his reach. Mr. Keane is a zealous systematic workman and loves his calling. Let us, therefore, hear what he has to say about man, past and present. The author is an evolutionist who thinks that the genealogy of man is made out. For him the ascent of the Hominidæ is in an independent line from some long-extinct, generalized form, from which the other families of anthropoidia sprung in independent lines. This precursor first appeared in the Indo-Malayan area. Indeed, Dubois's *Pithecanthropus erectus* is assumed as typifying nearly enough the first man.

The time when the precursor became man was in the Pliocene Tertiary, and a million years, more or less, would suffice for all human history. Four sub-species, or varieties of the percursor, were developed in as many separate areas, namely, *Homo Ethiopicus*, *Homo Mongolicus*, *Homo Americanus* and *Homo Caucasicus*.

The centrifugal Pleistocene precursor, erect in posture, but not differing greatly from his nearest ape-like kin in other respects, physical or mental, spread himself over the whole habitable globe. In four separate zones, the four varieties above named were evolved as independently as was the Pleistocene precursor himself. This view has led some to rank the author with the polygenists, but he denies this